

## ABSTRACT

Systems and methods that facilitate crystallization studies through the use of a system of microfluidics, sensors, actuators, and computer instrumentation to enable automated microcrystallization experiments using feedback assisted control and data from a protein crystallization or solubility database. In a preferred embodiment, the crystallization system comprises a database containing quantitative information about the chemical and physical properties under various thermodynamics conditions of the molecule or compounds of interest and a feedback assisted, dynamically controlled chemical system. The chemical system includes a controller that accesses the database and can monitor and control the state of one or more experiments, a software program that uses database information, sensory information, historical information and the like to change the conditions of the experiment, and a crystallization platform that allows computer control and sensing of one or more chemical experiments.